REMARKS

The Official Action dated December 16, 2003 has been received and its contents carefully noted. In view thereof, claims 18 and 22-26 have been amended in order to better Define that which the Applicant regards as invention and new claims 27 and 28 have been added. Accordingly, claims 7-9, 13 and 18-28 are presently pending in the instant application.

Initially, Applicant wishes to acknowledge the Examiner's indication on page 4 of the Office Action that claims 22-26 are allowable over the prior art record. Consideration of the foregoing amendments and indication of allowance of these as well the remaining pending claims is earnestly solicited.

Referring now to page 2 out of the Office Action, claims 7-18 have been rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,962,113 issued to Brown et al. This rejection is respectfully traversed in that the patent to Brown et al. neither discloses nor suggests that which is presently set forth by Applicants claimed invention.

Initially, it is noted that the Examiner rejects claims 7-18 under 35 U.S.C. §102(b), however, claims 10-12 and 14-17 have been canceled consequently any discussion with respect thereto is not believed to be warranted.

In accordance with the present invention, when an organic polymer film which can be used as an interlayer dielectric film of the VLSI, is porous, the dielectric constant of the interlayer dielectric film is low. However, as the Examiner can readily appreciate, the porous interlayer dielectric film faces a problem associated with mechanical strength, the thermal resistance and the adhesion to a substrate of the interlayer dielectric film being lowered. In order to overcome these shortcomings, a feature of the present invention and particularly the method for forming a semiconductor device recited in the independent claim 18 includes the steps of polymerizing a plurality of first cross-linking molecules each having a three-dimensional structure and a plurality of second cross-linking molecules each having a two-dimensional structure to form an interlayer dielectric film composing a three-dimensional polymerized organic polymer. Further, each first cross-linking molecule comprises a first organic molecule having three or more functional groups attached thereto, and each second cross-linking molecule comprises a second organic molecule having two sets of functional groups attached to thereto such that during the polymerizing step, a three-dimensional

polymerized organic polymer structure having a plurality of molecular level pores is formed by forming a unit with a three-dimensional structure composed of a plurality of polygons having the first cross-linking molecules in each apex and the second cross-linking molecules on each side.

With respect to the teachings of Brown et al., this reference discloses that in an integrated circuit device including interconnecting metallic circuit lines, the dielectric material, which is used as and interlayer dielectric film, comprises the reaction product of an organic polysilica and polyamic ester terminated with a trialkoxysilylalkyl group. It is further noted that the polyamic ester with the end group is formed from the reaction of a diamine having attached thereto two sets of functional groups in one molecule, the second cross-linking molecule; a diester diacyl halide having attached thereto three or more functional groups in one molecule, the first cross-linking molecule; and an aminoalkoxysilane. Thus, the polyamic ester is a three-dimensionally polymerized organic polymer having a linear structure in which the first cross-linking molecules and the second cross-linking molecules are alternatively coupled as can be readily appreciated from the chemical formula at formula 7 of the reference. Unlike the teachings of Brown et al., the three-dimensionally polymerized organic polymer is an organic polymer composed of a plurality of polygons having the first cross-linking molecules in each apex and the second cross-linking molecules on each side as it set forth in accordance with applicants claimed the invention. Accordingly, it is respectfully submitted that the present invention clearly distinguishes over the teachings of Brown et al. and that the structure of the three-dimensionally polymerized organic polymer to be used as a interlayer dielectric film is no where to be found in the teachings of Brown et al.

Accordingly, it is respectfully submitted that independent claim 18 as amended as well as new independent claim 27 clearly distinguishes over the teachings of Brown et al. and are in proper condition for allowance.

With respect to new claim 28, this claim recites a method of forming a semiconductor device including the steps of polymerizing a plurality of first cross-linking molecules each having a three-dimensional structure and a plurality of second cross-linking molecules each having a two-dimensional structure to form an interlayer dielectric film composing a three-dimensionally polymerized organic polymer having a number of molecular level porous. Further, the claim goes on to recite that the interlayer dielectric film is a porous organic

polymer film.

In this regard, it is noted that in Brown et al., the dielectric material includes the reaction product of an organic polysilica and polyamic ester terminated with a trialkoxysilylalkyl group as noted in column 3 lines 41-43. Since the dielectric material contains silica (SiOx), the interlayer dielectric film set forth by Brown et al. is a hybrid film made of organic/inorganic material. Due to the structure, a dielectric constant of the interlayer dielectric film becomes approximately 2.9 as noted in column 9 lines 61-64.

On the other hand, as noted in new claim 28, the inter dielectric film set forth there in as a porous organic polymer film, and therefore the dielectric constant is in arrange of 1.7 to 1.9 which is reduced sufficiently below that of Brown et al. Accordingly, in that the structure of the interlayer dielectric film set forth in accordance with the present invention is significantly different from that set forth in Brown et al., it is respectfully submitted that claim 28 is likewise believed to be in condition for allowance.

Therefore, in view of foregoing, it is respectfully requested that the rejection of record be reconsidered and withdrawn by the Examiner, that claims 22-26 again be indicated as allowable over the prior art record and that claims 7-9, 13,18, 19, 21, 27 and 28 likewise be indicated as being allowable of the prior art record and that the application be passed to issue.

Should the Examiner believe a conference would be of benefit in expediting the prosecution of the instant application, he is hereby invited to telephone counsel to arrange such a conference.

Respectfully submitted,

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